After 1.30 p. m. (October 24) the barometer commenced to rise, although the wind held steady from the northwest for several hours, gradually falling to moderate westerly by the morning of the 25th.

The S. S. *City of Stockholm*, bound north and about 120 miles northwest by west of the *Kathlamba*, experienced very little of the hurricane's fury.

That part of Mexico in the path of the storm had rainfall on the 24th–25th, which was quite heavy at some coastal points.

DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The month may be described as moderately cool and generally wet. An increase in the intensity of the general circulation was noticeable especially in the second decade when several deep barometric depressions moved from the Gulf of Mexico to the St. Lawrence Valley. An anticyclone that passed Midway Island in the Pacific on the 10th could be traced across the Pacific, the North American continent, and part of the Atlantic, where it merged with prevailing high pressure in that region on the 19th, after having traversed about one-third of the circumference of the globe.—*A. J. H.*

CYCLONES AND ANTICYCLONES

By W. P. DAY

Eighteen low-pressure areas were plotted, of which seven were of the Alberta type. The tracks of these seven were generally so far to the north that they had little direct effect on the weather in the United States and much of the real weather of the month was due to secondaries which formed over the Southwest. In fact, most of the Alberta LOWS were well shown at Fort Simpson, in the Mackenzie Valley before being picked up again along the line of Canadian stations; and pressure was continually below normal in Alaska and the Mackenzie Basin for about 12 days during the middle of the month. Several important storms developed over the Southwest and reached considerable intensity over the Lake region and the Northeastern States. On the last day of the month a tropical storm developed northwest of Cuba, crossed the Florida Peninsula with increasing intensity, reaching hurricane proportions off the northeast Florida coast and striking the coast again between Wilmington and Hatteras.

The more marked of the temperature depressions were due to Alberta HIGHS. These HIGHS were well shown at Fort Simpson and to some extent at Eagle, Alaska.

FREE-AIR SUMMARY

By L. T. SAMUELS

Free-air temperatures for the month averaged for the most part slightly below normal (Table 1). While the monthly departures did not vary greatly with increase in altitude, those for the upper levels at the northern and southern stations stand in rather marked contrast, being negative at the former and positive at the latter. Notwithstanding this deficiency in mean temperature, the relative humidities averaged generally below normal. This naturally resulted in negative departures in the mean vapor pressures for the month.

It will be seen in Table 2 that the resultant winds for the month based on kite observations differed but little from their normals. Those indicated by afternoon pilot-balloon observations, having been determined from a greater number of stations, show a pronounced westerly drift at the 3 km. level at all stations, including Key West.

Pilot-balloon observations from the 18th to the 21st showed a decidedly abnormal drift in the general circulation for this season. During this time practically the entire country was covered by a pronounced anticyclone which had moved inland over the North Pacific States and gradually spread southward and eastward until by the end of the period its southern border had invaded the tropics. This resulted in relatively low temperatures over an extended area in the lower latitudes, whereas low pressure attended by relatively high temperatures prevailed over the Canadian Provinces. The free-air temperature distribution during this period is strikingly shown in a comparison of the kite observations made at the four western aerological stations. These temperatures (°C.) are given in the following table, wherein the stations are arranged geographically.

Station	Date	Altitude (m.) m. s. l.				
		1,000	2,000	3,000	4,000	5,000
Ellendale	18	4.3	−1.8	−10.0		
Drexel	18	7.3	−0.7	−7.1		
Broken Arrow	18	9.6	2.8	−0.7		
Groesbeck	18	14.1	8.3	1.8		
Ellendale	19	5.9	1.7	−4.0	−8.3	−13.6
Drexel	19	3.9	−2.4	−7.0		
Broken Arrow	19	6.5	0.5	−6.8	−10.0	
Groesbeck	19	10.8	4.6			
Ellendale	20	12.4	7.6	2.9		
Drexel	20	9.8	6.7	2.1		
Broken Arrow	20	6.9				
Groesbeck	20	7.4	3.2			
Ellendale	21	−1.2	−5.7			
Drexel	21	11.6	5.0	−0.3		
Broken Arrow	21	9.8	6.0	1.0		
Groesbeck	21					

It is evident that the temperature reversal was most pronounced on the 20th, when it was 4.2° C. colder at 2,000 m. above the Texas station than at the same elevation over Ellendale, situated in the extreme northern part of the country.

The effect of this condition was temporarily to reverse the general pressure gradient aloft and thereby cause easterly winds in the upper levels. Some of those observed by pilot-balloon observations are shown in the following table.

Station	Date	Altitude (m.) m. s. l.								
		2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
Broken Arrow	19	nnw. 14	n. 11	nne. 10	ne. 16	nne. 14				
Do	20	w. 3	w. 3	sw. 4	e. 4	ese. 4	ene. 8			
Do	21	wsw. 10	wsw. 8	s. 4	ene. 6					
Denver	18	e. 6	ne. 4							
Do	19	ssw. 2	n. 6	nne. 6	ne. 8	ne. 11	ene. 10	ene. 15	ne. 16	
Do	20	sse. 3	nw. 2	nnw. 2	nw. 2	wnw. 2	w. 1	nnw. 2	wnw. 2	se. 1
Do	21	nne. 3								
Drexel	19	nnw. 12	n. 12	n. 14	nne. 19	nne. 22				
Due West	21	nne. 6	nne. 1	nne. 3	n. 4	nw. 6	wnw. 6	w. 8	w. 8	w. 23
Groesbeck	20	nne. 11	ese. 8	wnw. 6	wnw. 11	wnw. 19	w. 26	w. 32	w. 35	w. 39
Washington	20	nw. 8	n. 8	nne. 10						

Several unusually pronounced temperature inversions and isothermal conditions were observed during the month. One of the latter occurred at Royal Center on

the 3d in the rear of a deep anticyclone which had spread southward from the Hudson Bay region. The temperatures at the ground and at 2370 m. above were identical, the greatest variation throughout this air column being less than 3.0° C. and the wind southeasterly. On the next day (4th), this station still being under the influence of the HIGH, the lapse rate remained practically the same to this height, except that the temperatures were slightly higher throughout, the winds having changed to southerly and south-southwesterly. The lapse rates in the front sector of this HIGH as shown by airplane and kite observations at Washington and Due West, respectively, were characterized by a decrease in temperature from the ground to about 1,500 m., followed by a pronounced inversion to about 2,000 m., above which, to 3,000 m., the lapse rate was small. When these latter stations were later under the influence of the rear sector, an isothermal layer extended to the same height as had previously been observed at Royal Center under similar conditions.

Another exceedingly pronounced inversion, or rather double inversion, was observed at Groesbeck when a rapidly moving anticyclone passed over that station on the 8th. At the maximum altitude (2,612 m., m. s. l.), the temperature was 3.2° C. higher than at the surface. The vertical temperature gradients (°C. per 100 m.) shown by the kite observations are given in the following table.

Surface.	141 m.	604 m.	1,014 m.	1,501 m.	2,134 m.	2,612 m.
	0.82	−1.73	0.53	−0.60	0.25	

An excellent example of the well-known Brocken specter was observed during the airplane flight at Washington on the 6th. After the plane had surmounted a layer of St Cu, the base of which lay at 1,380 m. and the tops at 1,650 m., "the shadow of the plane on the clouds was surrounded by a brilliant double-colored ring, with the interior of the inner ring much brightened. The rings faded out as the plane ascended but remained visible long after the shadow of the plane had dwindled to nothing." The phenomenon was again plainly seen when descending from the maximum altitude to the top of the cloud layer.

A very marked surface of discontinuity was shown by the kite record at Ellendale on the 8th. In the NW. quadrant of an anticyclone the southerly winds of the lower levels shifted to northwesterly at 2,200 m. From the ground to this height the relative humidity was high, there being a layer of St clouds at 1,300 m. and occasional snow flurries. At the upper limit of the clouds (2,200 m.) a pronounced inversion (−3.36 °C. per 100 m.) prevailed throughout a 100 m. air column and the relative humidity dropped abruptly to 7 per cent and continued close to this value to at least 3,500 m., the maximum altitude reached. This very dry condition in the upper levels of the second quadrant of an anticyclone is in agreement with results obtained in a recent study of the average free-air conditions in HIGHS and LOWS for this country.

TABLE 1.—*Free-air temperature, relative humidities, and vapor pressure during November, 1925*

TEMPERATURE (°C.)

Altitude m. s. l. (meters)	Broken Arrow, Okla. (233 meters)		Drexel, Nebr. (396 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)	
	Mean	Departure from 8-yr. mean	Mean	Departure from 11-yr. mean	Mean	Departure from 5-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 8-yr. mean
Surface	7.9	−2.0	2.4	−1.1	9.1	−1.9	−1.6	+0.2	12.5	−0.5	2.6	−2.0
250	7.9	−1.9			8.9	−1.9			12.2	−0.6	2.4	−2.0
500	8.2	−0.8	2.6	−0.8	7.9	−1.9	−1.3	+0.5	11.8	−0.5	1.1	−1.9
750	8.4	+0.1	3.1	0.0	7.1	−1.7	−0.4	+1.2	11.6	−0.1	0.5	−1.7
1,000	8.2	+0.5	3.2	+0.2	6.2	−1.8	−1.1	+0.3	11.6	+0.4	0.1	−1.4
1,250	7.4	+0.3	2.8	0.0	5.4	−1.9	−1.6	−0.2	11.1	+0.7	−0.5	−1.4
1,500	6.3	−0.1	1.9	−0.3	5.2	−1.4	−2.0	−0.3	10.6	+1.0	−1.4	−1.7
2,000	4.4	−0.1	−0.4	−0.8	3.8	−1.2	−3.8	−0.6	9.2	+1.5	−3.2	−1.8
2,500	1.9	−0.4	−3.0	−1.1	2.7	−0.5	−6.2	−0.8	7.0	+1.3	−5.1	−1.8
3,000	−1.0	−0.9	−5.3	−0.8	1.7	+0.9	−9.3	−1.3	4.0	+0.8	−7.4	−1.9
3,500	−4.0	−1.4	−8.2	−1.0	0.2	+2.1	−11.8	−1.0			−10.0	−2.3
4,000	−6.3	−1.3	−11.3	−1.3	−2.0	+2.7	−14.4	−0.7			−13.0	−2.3
4,500			−13.8	−1.1			−17.6	−1.1			−15.7	−2.3
5,000			−16.7	−1.1			−20.0	−1.1			−19.1	−2.3

RELATIVE HUMIDITY (%)

Surface	67	+1	68	−3	67	−1	75	−3	75	0	72	−1
250	66	0			66	−1			72	0	72	−1
50	58	−4	64	−4	59	−4	72	−4	62	−4	71	−1
750	53	−6	57	−6	56	−4	65	−5	51	−10	71	+1
1,000	48	−8	52	−6	55	−3	63	−2	42	−15	67	+1
1,250	46	−7	50	−5	53	−3	60	−1	40	−14	62	0
1,500	45	−5	49	−4	46	−7	57	−1	38	−13	59	+1
2,000	41	−5	47	−3	34	−12	54	0	34	−12	50	−3
2,500	37	−6	45	−4	16	−24	52	−1	32	−9	45	−4
3,000	37	−5	46	−4	24	−15	54	+1	36	−2	44	−3
3,500	38	−1	46	−5	15	−24	56	+2			42	−3
4,000	31	−2	47	−4	12	−26	65	+8			42	−1
4,500			46	−3			69	+10			41	−1
5,000			44	−3			50	0			43	−1

VAPOR PRESSURE (mb.)

Surface	7.10	−0.96	5.01	−0.72	8.31	−0.86	4.13	−0.29	11.73	−0.07	5.41	−1.04
250	7.04	−0.96			8.10	−0.90			11.04	−0.29	5.40	−0.98
500	6.30	−0.94	4.81	−0.68	6.72	−1.17	4.07	−0.27	9.40	−0.75	4.94	−0.76
750	5.70	−0.91	4.37	−0.60	6.12	−0.96	3.84	−0.19	7.83	−1.22	4.70	−0.47
1,000	5.03	−1.06	4.01	−0.55	5.60	−0.89	3.45	−0.27	6.58	−1.55	4.28	−0.33
1,250	4.56	−1.00	3.71	−0.54	4.99	−0.83	3.18	−0.27	6.03	−1.21	3.62	−0.45
1,500	4.18	−0.83	3.37	−0.56	4.12	−1.04	2.96	−0.23	5.46	−1.00	3.17	−0.45
2,000	3.27	−0.72	2.71	−0.53	2.31	−1.51	2.44	−0.25	4.41	−0.58	2.16	−0.74
2,500	2.44	−0.72	2.07	−0.64	0.39	−2.47	2.00	−0.27	3.71	−0.04	1.58	−0.70
3,000	1.96	−0.61	1.72	−0.57	0.76	−1.53	1.61	−0.26	3.30	+0.53	1.19	−0.79
3,500	1.52	−0.42	1.39	−0.51			1.39	−0.14			0.94	−0.60
4,000	1.11	−0.23	1.06	−0.50			1.23	−0.05			0.58	−0.42
4,500			0.77	−0.44			0.87	−0.27			0.26	−0.42
5,000			0.55	−0.38			0.25	−0.58			0.08	−0.49

TABLE 2.—*Free-air resultant winds (m. p. s.) during November 1925*

Altitude m. s. l. (meters)	Broken Arrow, Okla. (233 meters)				Drexel, Nebr. (396 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak. (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)			
	Mean		8-year mean		Mean		11-year mean		Mean		5-year mean		Mean		8-year mean		Mean		8-year mean		Mean		8-year mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface	S. 26°W.	2.6	S. 42°W.	1.5	S. 51°W.	1.4	S. 78°W.	1.4	N. 24°W.	0.8	N. 63°W.	0.7	N. 62°W.	2.7	N. 54°W.	2.4	S. 21°E.	0.3	N. 66°E.	0.2	S. 59°W.	2.7	S. 49°W.	2.0
250	S. 28°W.	2.5	S. 41°W.	1.5					N. 28°W.	0.8	N. 63°W.	0.7					S. 33°E.	0.8	S. 57°W.	0.5	S. 55°W.	3.0	S. 54°W.	2.7
500	S. 45°W.	4.4	S. 35°W.	2.6	S. 61°W.	2.4	S. 82°W.	2.1	N. 34°W.	0.8	N. 81°W.	1.3	N. 64°W.	3.0	N. 64°W.	2.6	S. 21°E.	2.2	S. 9°E.	1.3	S. 69°W.	6.8	S. 60°W.	5.0
750	S. 55°W.	5.4	S. 40°W.	3.3	S. 80°W.	3.8	W.	3.7	N. 69°W.	1.4	N. 81°W.	1.9	N. 63°W.	4.6	N. 64°W.	4.1	S. 15°W.	2.3	S. 21°W.	1.9	S. 68°W.	8.0	S. 64°W.	6.4
1,000	S. 62°W.	6.0	S. 52°W.	3.9	N. 88°W.	5.0	N. 89°W.	5.1	N. 81°W.	2.3	N. 86°W.	2.6	N. 61°W.	5.6	N. 66°W.	5.0	S. 27°W.	3.3	S. 40°W.	2.6	S. 81°W.	8.8	S. 73°W.	7.2
1,250	S. 70°W.	6.1	S. 60°W.	4.7	N. 84°W.	5.9	N. 86°W.	6.0	N. 74°W.	3.6	N. 84°W.	3.9	N. 63°W.	6.6	N. 69°W.	5.9	S. 44°W.	3.6	S. 56°W.	3.3	S. 75°W.	5.7	S. 75°W.	7.4
1,500	S. 80°W.	6.1	S. 68°W.	5.4	N. 77°W.	7.1	N. 85°W.	7.0	N. 79°W.	4.8	N. 86°W.	5.2	N. 66°W.	7.2	N. 65°W.	7.1	S. 68°W.	4.2	S. 67°W.	3.9	S. 85°W.	10.4	S. 79°W.	8.7
2,000	S. 85°W.	7.1	S. 75°W.	6.7	N. 70°W.	10.0	N. 81°W.	8.4	S. 87°W.	7.0	S. 88°W.	7.4	N. 71°W.	9.8	N. 66°W.	8.9	N. 87°W.	5.2	S. 81°W.	5.2	S. 85°W.	11.8	S. 83°W.	10.1
2,500	S. 88°W.	8.4	S. 81°W.	7.5	N. 70°W.	10.9	N. 79°W.	10.1	N. 79°W.	9.1	S. 87°W.	8.9	N. 66°W.	11.4	N. 68°W.	11.0	S. 86°W.	6.6	S. 85°W.	6.9	S. 84°W.	13.5	S. 85°W.	11.7
3,000	N. 79°W.	8.9	S. 82°W.	8.6	N. 73°W.	11.7	N. 79°W.	11.2	S. 50°W.	14.3	S. 84°W.	10.1	N. 70°W.	12.2	N. 69°W.	12.8	S. 79°W.	10.9	S. 85°W.	8.6	S. 87°W.	14.9	N. 88°W.	13.1
3,500	N. 78°W.	9.4	S. 83°W.	9.2	N. 83°W.	15.9	N. 77°W.	12.4	S. 22°W.	11.0	S. 84°W.	11.7	N. 67°W.	14.0	N. 67°W.	13.6	S. 73°W.	11.7	S. 75°W.	10.5	N. 78°W.	16.5	N. 84°W.	13.0
4,000	N. 83°W.	7.4	S. 84°W.	10.5	N. 80°W.	11.9	N. 81°W.	13.4	S. 45°W.	12.0	S. 86°W.	13.4	N. 76°W.	14.1	N. 67°W.	13.3					N. 82°W.	17.2	W.	12.6
4,500	N. 68°W.	19.2	N. 83°W.	10.2	N. 83°W.	8.9	N. 85°W.	13.5	S. 45°W.	12.0	S. 86°W.	14.2	N. 66°W.	11.5	N. 61°W.	15.4					S. 87°W.	16.9	S. 84°W.	13.0
5,000					S. 85°W.	10.7	N. 82°W.	12.7					N. 22°W.	20.0	N. 70°W.	11.6					W.	20.0	W.	20.0

THE WEATHER ELEMENTS

By P. C. DAY, In Charge of Division

PRESSURE AND WINDS

Following a record-breaking month in many weather particulars, November, 1925, assumed more nearly the conditions expected in the last month of autumn, and, except in a few instances, was uneventful from a meteorological standpoint.

Cyclonic activity was confined mainly to the first half of the month, while anticyclones were in evidence during much of the latter half.

The month opened with an area of precipitation over the East Gulf and South Atlantic States, and as this moved northeastward heavy rains prevailed over limited areas near the coast from Georgia to Virginia. By the morning of the 4th a cyclone had advanced into the middle Plains, and, moving northeastward to Lake Superior, brought general rains to most of the central valleys, with some unusually heavy falls in east Texas. Immediately following this another cyclone overspread the territory somewhat south of that preceding, and it, too, moved northeastward, attended by general precipitation over nearly all central and eastern districts, heavy rains falling over portions of the Ohio and lower Mississippi Valleys, and local light snows in portions of the upper Lake region.

The third important cyclone developed off the middle Gulf coast during the 11th and by the morning of the 12th was central over northern Alabama, whence it moved to the lower lakes and northeastward during the following two days, as a severe storm attended by widespread and locally heavy rains over all sections from the Mississippi River eastward, and by high winds along the coast from Chesapeake Bay northward. A fourth cyclone was forming over the Southwest as this moved into the lower St. Lawrence Valley and by the middle of the month had advanced to the Ohio Valley, whence it moved northeastward. This, too, was attended by precipitation over much of the country from the Mississippi River eastward, though the amounts were generally less than fell in the preceding storm, except over portions of New England. Light snow fell in connection with this storm over much of the Lake region, Ohio Valley, and into New England.

The remainder of the month was without important cyclonic storms until about the 26th, when low pressure overspread northeastern Texas and during the following two days moved to New England, attended by precipitation over much of the country from the Mississippi Valley eastward.

As the month closed, a tropical storm passing over the Florida Peninsula gave some of the heaviest rains ever known over the more southern portions. At Miami a total fall of more than 15 inches occurred, 14.10 inches falling in 14 hours. A more extensive description of this storm will appear in the December issue of this REVIEW.

Anticyclones were confined mainly to western and northern districts during the first half of the month, but thereafter they were the dominant feature and extended into all portions, several reaching well into the South.

The monthly averages of pressure were highest over the middle and northern plateau, with a secondary high area over the Southeastern States, and they were above normal in all parts, save for a narrow area from Lake Superior to eastern Montana. Over southern Canada the average pressures were mainly below normal and this condition probably extended into the northern districts and over Alaska as well.

The surface winds attending the frequent cyclones were occasionally high, particularly about the 13th and 14th along the North Atlantic coast and in the lower Lake region; elsewhere high winds were mainly local and the far West was unusually free from severe storms for a late fall month.

The details of the more important wind and other storms appear at the end of this section.

TEMPERATURE

Important changes in temperature were rather frequent due to rapid pressure variations, but on the whole there were no great extremes, and the monthly averages were mainly not far from normal. A moderately cold area covered the Southeastern States and it was cooler than normal in all other districts from the Mississippi Valley eastward, save along the northern border, over much of New England and in southern Florida. It was cooler than normal also over the plateau region and portions of the southern Plains.

Average temperatures were above normal on the Pacific coast, along the entire northern border, over much of New England, and from the middle Plains northward into Canada, the departures increasing toward the north where in portions of the Northwest Provinces, the month was decidedly warm with the probability that this condition extended far to the northward and into Alaska